

Appl. No. 10/502242
Reply to Action dated June 14, 2006
Page 2

RECEIVED
CENTRAL FAX CENTER
SEP 14 2006

IN THE CLAIMS

Amendments To The Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) An optical head for recording a signal in an optical recording medium or reproducing a signal recorded in the optical recording medium, the optical head comprising:

a light source;

an objective lens for focusing light emitted from the light source on the optical recording medium;

a tilt-related-aberration correcting means for correcting an aberration that occurs when the optical recording medium tilts; and

a driving amount determining means for determining a driving amount necessary for the tilt-related-aberration correcting means,

wherein the tilt-related-aberration correcting means is a means for tilting the objective lens which is provided with the driving amount determined by the driving amount determining means according to information concerning a tilt of the optical recording medium and information concerning a substrate thickness of the optical recording medium;

the objective lens has a certain set numerical aperture (NA), and

a tilted amount of the objective lens is varied according to the substrate thickness of the optical recording medium.

2. (Canceled)

3. (Canceled)

Appl. No. 10/502242
Reply to Action dated June 14, 2006
Page 3

RECEIVED
CENTRAL FAX CENTER

SEP 14 2006

4. (Original) The optical head according to claim 1,
wherein the objective lens has a NA of not less than 0.7.
5. (Original) The optical head according to claim 1,
wherein the driving amount determining means is a memory in which information concerning the driving amount for the tilt-related-aberration correcting means that is necessary for correcting an aberration that occurs due to a tilt of the optical recording medium is stored, the driving amount being determined according to the information concerning the tilt of the optical recording medium and the information concerning the substrate thickness of the optical recording medium.
6. (Original) The optical head according to claim 1, further comprising a tilt detecting means for detecting information concerning the tilt of the optical recording medium.
7. (Original) The optical head according to claim 6,
wherein the tilt detecting means comprises:
a second light source different from said light source;
a focusing lens for focusing light emitted from the second light source on the optical recording medium; and
a photodetector for detecting light reflected by the optical recording medium.
8. (Original) The optical head according to claim 6,
wherein the tilt detecting means detects focus zero-crossing positions at two certain points in a radial direction of the optical recording medium, and detects a tilting amount of the optical recording medium based on a difference between values of a focus search voltage at the two points, the focus search voltage being a voltage for detecting the focus zero-crossing position.

Appl. No. 10/502242
Reply to Action dated June 14, 2006
Page 4

9. (Original) The optical head according to claim 1, further comprising a memory in which information concerning the substrate thickness of the optical recording medium is stored.

10. (Original) The optical head according to claim 1, further comprising a substrate thickness detecting means for detecting information concerning the substrate thickness of the optical recording medium.

11. (Original) The optical head according to claim 10,
wherein the substrate thickness detecting means comprises:
a second light source different from said light source;
a focusing lens for focusing light emitted from the second light source on the optical recording medium; and
a photodetector for detecting light reflected by the optical recording medium.

12. (Original) The optical head according to claim 10,
wherein the substrate thickness detecting means detects the information concerning the substrate thickness of the optical recording medium according to focal positions of two light beams, the two light beams being a first light beam on a side closer to an optical axis and a second light beam on an external side as compared with the first light beam.

13. (Original) The optical head according to claim 1,
wherein
the tilt-related-aberration correcting means is formed with an optical element, the optical element comprising a pair of substrates having transparent conductive thin films, respectively, and a phase shifting layer interposed between the pair of substrates, and
a pattern capable of correcting an aberration that occurs due to the tilt of the optical recording medium is formed on one of the conductive thin films.

Appl. No. 10/502242
Reply to Action dated June 14, 2006
Page 5

14. (Original) The optical head according to claim 1, further comprising a substrate-thickness-related-aberration correcting means for correcting an aberration that occurs due to a deviation of the substrate thickness of the optical recording medium from a standard value of the substrate thickness.

15. (Original) The optical head according to claim 14,
wherein the substrate-thickness-related-aberration correcting means comprises:
a positive lens group and a negative lens group disposed in an optical path; and
a means for varying a lens distance between the positive lens group and the negative lens group.

16. (Original) The optical head according to claim 14,
wherein
the substrate-thickness-related-aberration correcting means is formed with an optical element, the optical element comprising a pair of substrates having transparent conductive thin films, respectively, and a phase shifting layer interposed between the pair of substrates, and
a pattern capable of correcting an aberration that occurs relating to the substrate thickness of the optical recording medium is formed on one of the conductive thin films.

17. (Original) The optical head according to claim 14,
wherein
the tilt-related-aberration correcting means and the substrate-thickness-related-aberration correcting means are formed with one optical element, the optical element comprising a pair of substrates having transparent conductive thin films, respectively, and a phase shifting layer interposed between the pair of substrates, and
a pattern capable of correcting an aberration that occurs relating to the substrate thickness of the optical recording medium is formed on one of the conductive thin films,
and

Appl. No. 10/502242
Reply to Action dated June 14, 2006
Page 6

a pattern capable of correcting an aberration that occurs due to the tilt of the optical recording medium is formed on the other conductive thin film.

18. (Previously presented) The optical head according to claim 13,
wherein the phase shifting layer is made of liquid crystal.

19. (Currently amended) An aberration correcting method for correcting an aberration that occurs when an optical recording medium tilts, by using an optical head for recording a signal in the optical recording medium or reproducing a signal recorded in the optical recording medium, the optical head comprising:

a light source;

an objective lens for focusing light emitted from the light source on the optical recording medium, wherein the objective lens has a certain set numerical aperture (NA);

a tilt-related-aberration correcting means comprising:

a means for tilting the objective lens for correcting an aberration that occurs when the optical recording medium tilts and according to the substrate thickness of the optical recording medium, and

a driving amount determining means for determining a driving amount necessary for the tilt-related-aberration correcting means,
the method comprising the step of providing the tilt-related-aberration correcting means with the driving amount determined by the driving amount determining means according to information concerning a tilt of the optical recording medium and information concerning a substrate thickness of the optical recording medium.

20. (Previously presented) An optical recording/reproducing device comprising an optical head for recording a signal in an optical recording medium or reproducing a signal recorded in the optical recording medium,

wherein the optical head is the optical head according claim 1.